



United States
Department of
Agriculture

Agricultural
Research
Service

National Soil
Dynamics
Laboratory

Conservation
Systems
Research

Research
Project
Description
No. 43

December 2003

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Conservation Systems Research

Tillage Timing and Soil Moisture at Planting in Conservation Tillage Systems for Cotton

RESEARCH PROJECT DESCRIPTION NO. 43



Devices for measuring soil water content are critical tools for determining the impact of different management systems.

Researchers

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The Challenge

Soil moisture is a critical factor for seed germination. If mismanaged, cover crops can use water needed by the following crop. They can also retard soil warming in the spring, delaying germination. With good management, however, cover crops protect the soil from erosion and increase organic matter in the soil, improving soil quality over time. Additionally, tillage type and time of tillage have a great impact on water infiltration, affecting soil moisture early in the season.

Seed germination and stand count can be maximized in conservation systems when cover crops and conservation tillage are managed to protect and improve the soil while preserving moisture necessary for germination of the following crop.

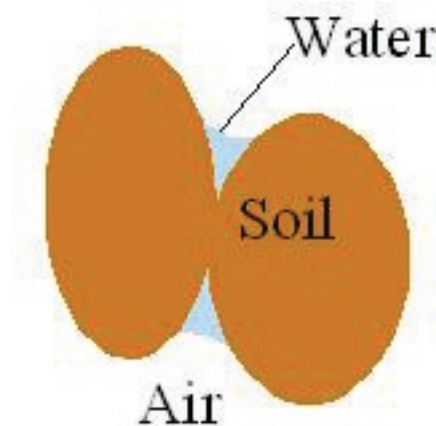
The Experiment

The study is being conducted at the Alabama Agricultural Experiment Station's E.V. Smith Research Center, near Milstead, to:

- Evaluate the effect of spring and fall tillage operations on soil moisture at planting.
- Determine the effect of a winter cover crop on soil moisture and temperature conditions at planting.

Two winter cover crop treatments (rye and no cover) will be compared in a cotton production system. The cover crop will be killed chemically four weeks before planting and flattened with a roller. Three conservation tillage systems (no till, strip-till, and paratill) will be evaluated. Timing of tillage operations will include fall and spring; prior to cover crop planting, and prior to cotton planting. Plant data being collected includes crop stand counts and yield and weed emergence. Soil information being collected includes bulk density, water infiltration, soil water content, soil temperature, and penetrometer resistance.

“... cover crops protect the soil from erosion and increase organic matter in the soil, improving soil quality over time.”



The soil is a three-phase system, including solid, gas, and liquid phases. An adequate balance among these is needed for proper crop establishment.